



ISSN NO. 2320-5407

*Journal homepage: <http://www.journalijar.com>*  
*Journal DOI: [10.21474/IJAR01](https://doi.org/10.21474/IJAR01)*

INTERNATIONAL JOURNAL  
OF ADVANCED RESEARCH

## RESEARCH ARTICLE

### Environment Protection through Green Supply Chain Management: A Case Study of an Aluminum Industry.

**Ms. Sharvani Satpathy.**

IIInd Semester M.Sc Environmental Science, Sambalpur University.

#### Manuscript Info

##### Manuscript History:

Received: 4 February 2016  
Final Accepted: 19 March 2016  
Published Online: April 2016

##### Key words:

##### \*Corresponding Author

**Ms. Sharvani Satpathy.**

#### Abstract

This study aims to investigate the Green Supply Chain Management Practices followed by an Aluminum Industry in India to protect the environment. The study has been made through interviews and questionnaire surveys among the employees of the same industry. The perception of the employees relating to Green Supply Chain Management Practices and environmental performance are studied. The data were analyzed using "MEAN SCORE". The results show the factors and the dimensions that are to be taken care by the industry for successful implementation of Green Supply Chain Management.

*Copy Right, IJAR, 2016,. All rights reserved.*

#### Introduction:-

"Green Supply Chain Management (GSCM) also known as ESCM (Environmental Supply Chain Management) is the way organizations respond to the need for a more sustainable environment in their supply chain management (Srivastava, 2007). GSCM aims to improve the environmental impacts of a company. Apart from environmental protection GSCM is also important for cost savings, improved efficiency, and/or profitable customer awareness (Jackson & Clift, 1998; Rao, 2007; Srivastava, 2007). Some companies show commitment to GSCM practices on their websites and even change their mission statements, but often they go for "green-washing" (misinformation that presents an environmentally responsible public image) and not a real commitment (Davies & Hochman, 2007). The objectives of GSCM are aimed at finding a win-win strategy to benefit the environment as well as the performance of the company. The companies adopting GSCM want both to fulfill the expectation of the regulators and to satisfy the increasing demands of the customer. These companies strive to go further from compliance to competitiveness (Pun, Hui, Lau, Law, & Lewis, 2002). For this reason it has become imperative to know to what extent the companies have adopted GSCM." [Eltong,J., (2009)].

This study is to investigate practices and implementation of green supply chain and environmental performance of an Aluminum Industry in India. Green Supply Chain Management practices implementation is comprised of 14 factors namely Eco-Procurement, Eco-Accounting, Eco-Logistics Design, Eco-Product Design, Eco-Manufacturing, Marketing & Communication, Economic Performance, Environmental Performance, Customer Co-operation, Human and Technological Resources, Internal Environmental Management Performance, Operational Performance, Stakeholders, Vendor Management. (Kumar, Chattopadhyaya, Sharma, 2012).

Result and comparative analysis of various factor of green supply chain management made in this study has been shown by calculating "mean score" and by graphical representation. The questionnaire for collecting the data has been designed on the basis of the study made by Kumar, Chattopadhyaya, Sharma, 2012.

#### Importance of GSCM:-

"The literature gives extensive reasons why GSCM will become increasingly important for more and more companies in the future. The list of stakeholders interested in environmental strategies ranges from customers, competitors, potential investors, employees, neighbors, environmental legislation, and non-governmental organizations (NGOs) (Basu & Wright, 2008; Geyer & Jackson, 2004; Reiskin, White, Johnson, & Votta, 1999; Vachon & Klassen, 2006).

Due to stakeholder pressure, Robinson & Wilcox (2008) see the biggest impact coming from big, internationally operating companies. After surveying some of the biggest companies worldwide, they found that more than 90% of these companies are considering demanding environmental sustainable practices from their suppliers in future. More than 50% stated that they have already implemented some form of green-minded supplier qualification.

These companies expect that their suppliers start to think green and act accordingly. The research of Reiskin, White, Johnson & Votta (1999) supports these findings. They see a shift from production-focused to service-focused industries, which are accompanied by outsourcing. Instead of delivering quantity, suppliers are expected to deliver quality and solutions for problems which benefit the environment. Thus, suppliers have to deal with environmental issues of their customers in a more sustainable way. This in turn leads to different prerequisites for the relationship between supplier and customer. The conventional relationship sees conflicting interests. The supplier wants to increase his volume sold (e.g. chemicals), whereas the customer wants to decrease this volume and his costs. In the service focused industry, both customer and supplier want to increase the value and efficiency of the service (e.g. fewer chemicals, higher output).

Trowbridge (2001) discerns between internal and external drivers for the implementation of GSCM at chip manufacturer Advanced Micro Systems (AMD). Internal drivers are the willingness to improve risk management due to potential interruptions in the supply chain, and the collaboration with suppliers to find alternative materials and equipment to minimize environmental impacts.

External drivers are mainly customer requests, investors and non-governmental organizations (NGOs) (Trowbridge, 2001). More and more customers are trying to get information about the environmental impact of products and their buying decision dependent on that. NGOs like Greenpeace or World Wide Fund for Nature (WWF) expose companies harming the environment and through that affect customer behaviour.

It is frequently mentioned that saving resources and energy cuts down costs (Jackson & Clift, 1998; Rao, 2007; Srivastava, 2007). Profitable pollution prevention is an inherent mechanism in making production processes more efficient (e.g. the amount of energy needed to produce iron and steel has fallen continually since the Industrial Revolution) (Jackson & Clift, 1998).

Thus the need for the implementation of green practices has many reasons, but the aspiration of a sustainable competitive advantage is for many authors the decisive reason for GSCM (Geyer & Jackson, 2004; Mahler, 2007; Markley & Davis, 2007; Piplani, et al., 2008; Rao, 2007; Rezaee & Elam, 2000; Sarkis, 2003; Suppliers' perspectives on greening the supply chain, 2001; Zhu, et al., 2008). The facing of environmental issues is not just a precondition for long term survival but also for long-term profitability (Khoo, Bainbridge, Spedding, & Taplin, 2001). Nonetheless, one motivation is not widely accepted in the literature, namely automatic superior economic advantages coming with environmental practices. Some research questions the guaranteed generation of win-win situations through GSCM practices (Reinhardt, 1998; Zhu & Sarkis, 2007).

Regulatory pressure is increasing continuously. Reinhardt (1998) observes that ultimately environmental quality needs governmental regulation, as the environment is a public good.

According to him, people and especially companies will not spend any more on environmental issues than is required to achieve their own maximizing economic goals, as these investments would not benefit themselves in total. So the need for green practices is often not just out of own choice, but compulsory by law.

Several researchers have different points of view about the advantages of the implementation of GSCM:

- A report for the Business for Social Responsibility Education Fund (Suppliers' perspectives on greening the supply chain, 2001) enumerates cost reductions, greater operational efficiencies, enhanced value to customers, increased sales, positive media attention, and positive ratings from investment firms as benefits of the implementation of GSCM.
- Seuring (2001) sees the improved relationships between the supply chain members as a source of competitive advantage.
- Thierry, Salomon, van Nunen & van Wassenhove (1995) mention that greener products help to get and retain environmentally conscious customers and employees. Furthermore future liabilities can be lowered, as well as insurance rates and disposal costs. Even future legislation could be influenced through lobbying, and pro-active companies would gain an advantage.

- Rao (2007) sees other main motivators in the Philippine context. Here the customer pressure and the desire to avoid potential export limitations come first. Customer pressure is based on the customer demands in developed countries, who want more green products. Therefore the whole supplier base needs to conform to these world-class standards, especially to the ISO 14000.

More motivators for greening the supply chains are reducing the risk of environmental hazards, fear of bad publicity, cost of non-compliance, governmental penalties and just to demonstrate an image as an environmentally responsible company. Thus, eventually globalization can be identified as a main driver for the development of GSCM. As most products are made by more than one company, there needs to be an alignment of decisions and strategies to use scarce resources effectively (Piplani, et al., 2008).” (Elting, 2009)

### Literature review:-

“There are only a few studies related to Green Supply Chain Management. Approaches towards Green Supply Chain Management (GSCM) practice have been identified by various researches; they are briefly outlined below. Shang et al. (2010) conducted a study based on six dimension of green supply chain management i.e. eco design, green manufacturing and packaging, environmental participation, green marketing, stock and suppliers. The results inferred that the firms which were focusing on green marketing had been successful competitors against the rivals. Lamming and Hampson (1996) explored the concepts of environmentally sound management and linked them to supply chain management practices such as vendor assessment, collaborative supply strategies, establishing environmental procurement policy and working with suppliers to enable improvements. A decision model is developed by Handfield et al. (2002) to measure environmental practice of suppliers using a multi attribute utility theory approach. Walton et al. (1998) identified several dimensions of change to increase the impact of procurement on environmental results. Quinghu Zhu et al (2008) conceptualize Green Supply Chain Management practices implementation as encompassing different dimensions of practices including Green Procurement, Internal Environmental Management, Eco Design, Customer Cooperation, and Investment Recovery. Ramudhin A., et al. (2010) proposed a strategic planning model and insisted that internal and external control mechanisms are of great importance to decision makers while designing sustainable supply chain network.” (Kumar, Chattopadhyaya, Sharma, 2012)

This study aims to examine the implementation of Green Supply Chain Management practices focusing on 14 factors with 105 underlying dimensions as identified by Kumar, Chattopadhyaya, Sharma, 2012. The factors and the underlying dimensions are shown in the TABLE 1.

**Table 1: factors with underlying dimensions**

<b>FACTOR 1: ECO PROCUREMENT</b>	
1	Provides design specification to suppliers that include environmental requirements for purchased item
2	Co-operation with suppliers for environmental purchasing
3	Existence of cell for environmental audit for suppliers internal management
4	Procurements mainly from ISO14000 certified suppliers
5	Second-tier supplier’s environmentally friendly practice evaluation
6	Implementation of eco-labeling/eco-logo of products
7	Work with other business functions to discuss and improve purchasing procedures.
8	Provision of education/assistance to suppliers on environmental matters in order to increase supply chain efficiency.
9	Communication regarding environmental procurement criteria/requirements to marketing staff, employees, stakeholders, and customers
10	Co-operation with customers for environmental packaging
<b>FACTOR 2: ECO ACCOUNTING</b>	
11	Environmental costs associated with operations and processes (e.g. monitoring and abatement equipment, waste disposal etc.) are taken care
12	Accounting the costs to the customers associated with the use and disposal of the products
13	Communication of environmental costs to customers and within the industry in key business functions
14	Assisting in evaluation of environmental cost with respect to capital purchases and new technology
15	Generate activity based costing in various department or business function
<b>FACTOR 3: ECO LOGISTICS DESIGN</b>	
16	Reverse logistics applied in stock planning

17	Application of environmental issues in the design of logistics management
18	Identification, Collection & distribution of products/parts that will be recycled, reused
19	Recollection planning for packaging material
20	Minimizing the use of packaging considered
	<b>FACTOR 4: ECO PRODUCT DESIGN</b>
21	Design of products for optimum consumption of material/energy
22	Product designed for reuse, recycle, recovery of material, components parts
23	Design consideration of products to avoid or reduce use of hazardous of products
24	Design of products to reduce waste & costs
25	Products are design & develop meet environmental regulation and safety standards
26	Co-operation & feedback with customer in developing eco-design
27	Products are design & developed for ease in dismantling & remanufacturing
28	Application of value engineering/analysis in the design of products
29	Evaluation of product durability
30	Possibility of eliminating secondary processes (polishing/painting etc.) considered.
	<b>FACTOR 5: ECO MANUFACTURING</b>
31	Possibility of product being recyclable, reusable
32	Avoid or minimize the amount of hazardous material used in product production
33	Are designers using life cycle engineering to improve the environmental performance and production efficiency of the products
34	Measures taken to reduce material, water & energy used in manufacturing
35	Optimizing the use of energy generated from renewable sources in manufacturing operations
36	Inclusion of recycling program for manufacturing operation
37	Industry has established program to increase the service intensity of the products
38	Determination of environmental impacts and costs of the products throughout their life-cycle
39	Minimizing toxic/hazardous waste during manufacturing
40	Optimum energy consumption during manufacturing process
41	Integrated environmental & efficiency criteria implementation in process design
42	Minimizing use of natural resources during manufacturing is considered
43	Consideration of environmental issue in the process of production planning and control
44	Environmental issue considered during selection of manufacturing process
45	Reduced setup time
	<b>FACTOR 6: MARKETING AND COMMUNICATION</b>
46	Assisting customers to improve their environmental performance
47	Environmental requirement and activities of customer concern are monitored
48	Awareness regarding environmental information to new and existing employees
49	Departmental interaction and exchange of information regarding environment, performance, efficiency etc.
50	Use of environmental information during product marketing & communications material
	<b>FACTOR 7: ECONOMIC PERFORMANCE</b>
51	Waste discharge methodology for reducing cost
52	Reduction in cost for materials purchasing without affecting the quality of the product
53	Reduction in cost of energy consumption
54	Effective waste treatment management for reducing cost
55	Reduction of the fine for environmental accidents
	<b>FACTOR 8: ENVIRONMENTAL PERFORMANCE</b>
56	Minimization of air emission
57	Minimization of solid waste
58	Improve production procedure/method for reducing waste/scrap
59	Recovery through sale of scrap and used/rejected material
60	Recovery through sale of excess capital equipment
61	Recovery through sale of old/obsolete equipment
62	Recycling of waste water
63	Optimization of man power resources in production process
64	Reduction of consumption for hazardous materials

65	Reduction in frequency of environmental accidents
	<b>FACTOR 9: CUSTOMER CO-OPERATION</b>
66	Co-operation from customers for eco-design
67	Co-operation from customers for cleaner production
68	Co-operation from customers for green packaging
60	Co-operation from customers for using less energy during product transportation
70	Co-operation with customers for environmental procurement
	<b>FACTOR 10: HUMAN AND TECHNOLOGICAL RESOURCES</b>
71	Improvement in worker safety
72	Motivate workers for environmental consciousness
73	Increase supervisor training
74	Use of energy efficient technologies
75	Consultation with environmental experts before using new technology
	<b>FACTOR 11: INTERNAL ENVIRONMENTAL MANAGEMENT PERFORMANCE</b>
76	Promotion of quality circles
77	Existence of environmental and auditing program
78	Provision of training in environmental management
79	Implementation of ISO 14001 certification
80	Commitment of green supply chain management policy by senior managers
81	Awareness about the green supply chain management measures adopted by the competitors
82	Existence of total quality environmental management
83	Updating the current and proposed environmental regulations and legislation that may impact on business
84	Existence of policy related to green supply chain management linking environmental, economic, process performances
85	Support for green supply chain management from junior & middle level
	<b>FACTOR 12: OPERATIONAL PERFORMANCE</b>
86	Reduced inventory level
87	Reduction in scrap
88	Promote environmental quality products
89	Optimization of capacity utilization
90	Amount of goods delivered on time
91	Monitoring the environmental and implementation for the improvement within industry
92	Program to promote and track the reduction of waste
93	Waste management program for compliance with all applicable regulations
94	Selection and use of energy efficient equipments and fixture for electrical, mechanical and lighting application
95	Development of a prevention program to identify and eliminate sources of pollution
	<b>FACTOR 13: STAKEHOLDERS</b>
96	Consideration & application of environmental issues because of regulatory concerns
97	Consideration & application of environmental issues because of suppliers
98	Consideration & application of environmental issues because of trade organizations
99	Consideration & application of environmental issues because of employee concerns
100	Consideration & application of environmental issue because of customer & market pressure
	<b>FACTOR 14: VENDOR MANAGEMENT</b>
101	Environmental performance is an important criteria in vendor selection
102	Environmental awareness among the vendors
103	Environmental certified vendor is considered
104	Environmental issues are regularly shared by vendors.
105	Feedback on environmental issues for the product supplied.

### Objective of the research:-

The objective of this paper is to investigate the practice and implementation of Green Supply Chain Management in an Aluminum Industry in India and to know which factors and underlying dimensions are weak in the industry's Green Supply Chain Management policy.

### Research methodology:-

The Competitive Strategies and Best Practices Benchmarking Questionnaire have been developed based on the study made by Kumar, Chattopadhyaya, Sharma, 2012. There is a set of 105 items in the questionnaire. The questionnaire consists of total 14 factors with 105 underlying dimensions. The target respondents of our survey were the employees of the company in study and they were requested to indicate, using a five-point Likert scale (1-Below average/Completely disagree, 2-Average/ Rarely agree, 3-Good/ Partly agree, 4 –Very good/ Rather agree, 5-Excellent/Completely agree), the extent to which they perceived their company is implementing each of the dimensions of GSCM practices. Item analysis was conducted for each of the 105 statements through a —MEAN SCORE. This study measures the different facets of GSCM practices implemented in the company and there by enabling the company to evaluate its strength and weakness. The questionnaire was distributed to 50 managers but only 30 respondents returned the questionnaire. Convenient sampling method is adopted in this survey. The respondents were all managers working in the industry. A regression analysis has also been carried out to know the contributions of different factors to the effectiveness of implementation of the GSCM in the plant.

### Results:-

The MEAN SCORE and the DIMENSIONS of GSCM are shown in the TABLE 2A & 2B. The GRAPH 1 is plotted taking 105 DIMENSIONS of GSCM in X Axis and MEAN SCORE in Y Axis. GRAPH 2 depicts the 14 Green Supply Chain Factors in X Axis and the MEAN SCORE in Y Axis.

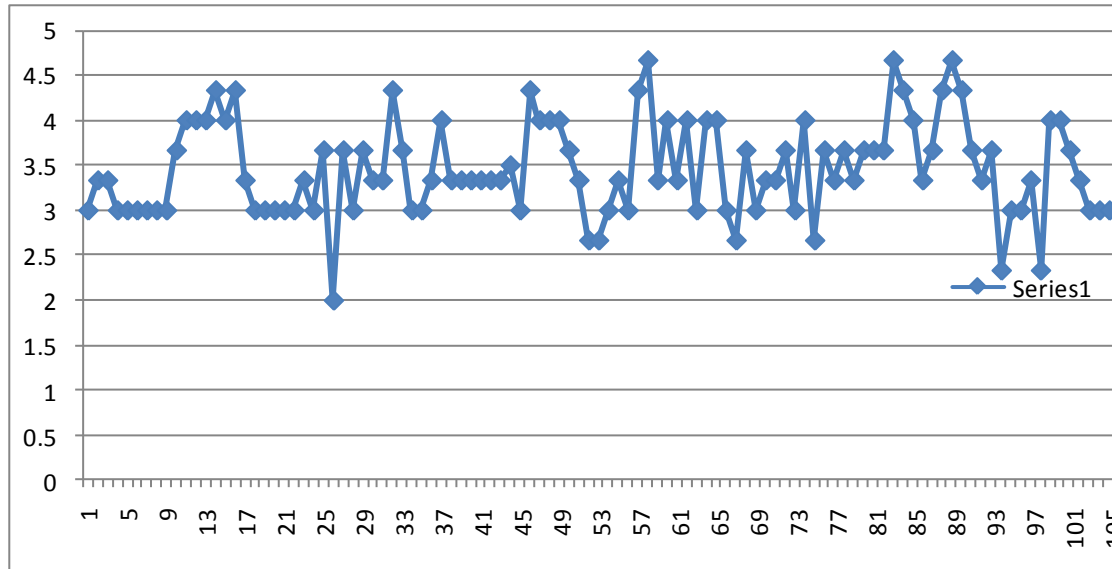
**Table 2a: dimensions and mean score**

Dimensions	Mean score	Dimensions	Mean score	Dimensions	Mean score	Dimensions	Mean score	Dimensions	Mean score
1	3	11	4	21	3	31	3.33	41	3.33
2	3.33	12	4	22	3	32	4.33	42	3.33
3	3.33	13	4	23	3.33	33	3.66	43	3.33
4	3	14	4.33	24	3	34	3	44	3.5
5	3	15	4	25	3.66	35	3	45	3
6	3	16	4.33	26	2	36	3.33	46	4.33
7	3	17	3.33	27	3.66	37	4	47	4
8	3	18	3	28	3	38	3.33	48	4
9	3	19	3	29	3.66	39	3.33	49	
10	3.66	20	3	30	3.33	40	3.33	50	3.66

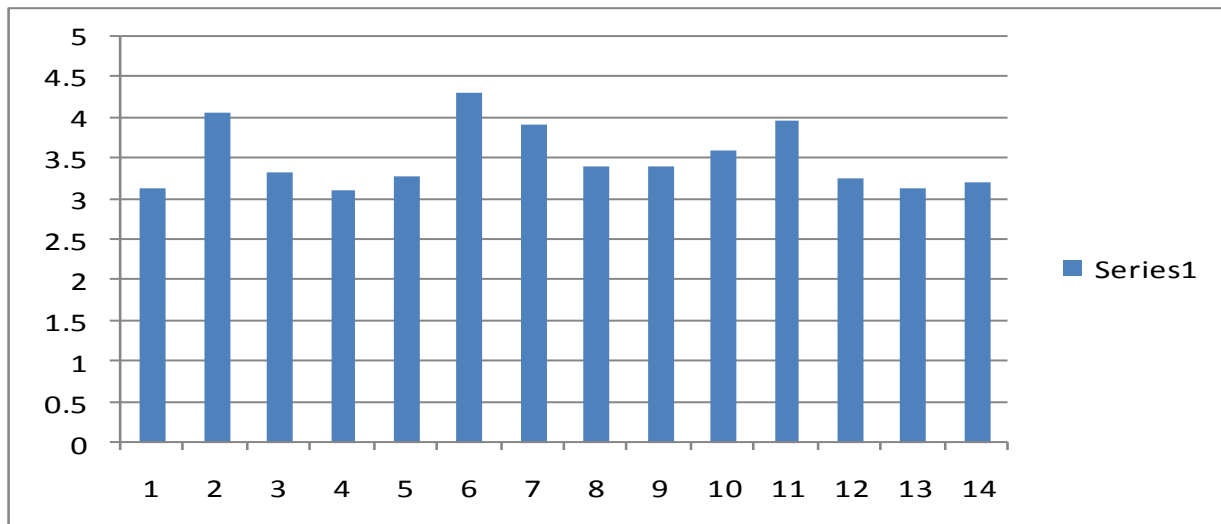
**Table 2b: dimensions and mean score**

Dimensions	Mean score	Dimensions	Mean score	Dimensions	Mean score	Dimensions	Mean score	Dimensions	Mean score	Dimensions	Mean score
51	3.33	61	3.33	71	3.33	81	3.66	91	3.66	101	3.66
52	2.66	62	4	72	3.66	82	3.66	92	3.33	102	3.33
53	2.66	63	3	73	3	83	4.66	93	3.66	103	3
54	3	64	4	74	4	84	4.33	94	2.33	104	3
55	3.33	65	4	75	2.66	85	4	95	3	105	3
56	3	66	3	76	3.66	86	3.33	96	3		
57	4.33	67	2.66	77	3.33	87	3.66	97	3.33		
58	4.66	68	3.66	78	3.66	88	4.33	98	2.33		
59	3.33	69	3	79	3.33	89	4.66	99	4		
60	4	70	3.33	80	3.66	90	4.33	100	4		

**Graph 1: green supply chain dimensions and mean score**



Graph 2: green supply chain factors and mean score



**Regression analysis:-**

A regression analysis has been carried out by taking all the fourteen Factors into account and the equation obtained from the data is as follows

$$\text{Effectiveness of GSCM} = 23.7 + .51X_1 + .27 X_2 + .07X_3 + .06 X_4 + .22X_5 + .01X_6 + .05X_7 + .07X_8 + .1X_9 + .1X_{10} + .09X_{11} + .01 X_{12} + .06X_{12} + .21 X_{14}$$

**Discussions:-**

From the GRAPH 1 we can see that Dimension 26 has the lowest Mean Value i.e 2. This indicates that the Dimension under Factor 4 ECO PRODUCT DESIGN, Co-operation & feedback with customer in developing eco-design is the most neglected Dimension of the GSCM. The next Dimensions that are to be given proper importance are 94 & 98 under the Factors 12 &13 having Mean Value 2.33 which indicates that Dimension 94 coming under Factor 12 OPERATIONAL PERFORMANCE which states that Selection and use of energy efficient equipments and fixture for electrical, mechanical and lighting application is very poor. This is of great concern because energy efficiency leads to profit and also environmental protection by helping to emit less Carbon Dioxide and other toxic materials to the atmosphere. The company should go for regular energy audit and should procure energy efficient equipments to face the challenge of reducing the utilization of energy in the plant.

Dimension 98 that states Consideration & application of environmental issues because of trade organizations under Factor 13 STAKEHOLDER is to be taken care of immediately because stakeholders are the external drivers who decide about the business. The stakeholders include Customers, Suppliers, Government, Investors and Employees etc. They are the key elements of a business. It seems that the company is neglecting stakeholders view in GSCM mainly the trade organizations. Factors 1, 4 and 13 in general are to be improved because they have the Mean Value of 3.1. Therefore the Factors ECO PROCUREMENT, ECO PRODUCT DESIGN and STAKEHOLDERS ISSUES are of prime importance for the company to implement and derive the benefit of GSCM. This is quite evident from the GRAPH 2. From the regression analysis it is found that Factors 6 and 12 with coefficient 0.01 are contributing least to the effectiveness of GSCM in the plant. So the Factors FACTOR 6: MARKETING AND COMMUNICATION as well as FACTOR 12: OPERATIONAL PERFORMANCE is to be improved to increase the effectiveness of GSCM. Improving Factor 6 is very critical as its emphasis is on the customer care relating to the environment and educating the employees of the industry relating to the environmental related information. It also gives importance to the use of environmental information during product marketing & communications. This factor is crucial because it makes the stakeholders i.e customers and employees to be environmental friendly.

### Conclusion:-

In general the Aluminum manufacturing company has to work under hard time demands situation to meet the goals of GSCM and for long term business sustainability and have to follow modern and energy efficient manufacturing technique. From the survey of the industry, the scores are not up to the mark. Industry should implement a long term strategy to derive the benefit from GSCM. This will automatically improve the score card and performance. Today's demand is to go for GREEN MANUFACTURING and as the environmental protection legislations are becoming increasingly stringent, a focus on Green Operational excellence is becoming the norm in industries, this is lacking in the plant because from the result it is found that FACTOR 12: OPERATIONAL PERFORMANCE is to be improved for the plant. We hope that empirical studies like this would help the industries to know the strength and weakness of GSCM implementation and can help managers/supervisors to improve their understanding of Green Supply Chain Management practices. This would enable decision makers of the companies to assess the perception of GSCM in their organization.

### References:-

1. Basu, R., & Wright, J. (2008). *Total supply chain management*. Oxford: Elsevier.
2. Chetan Kumar M. Sedani, Ramesh R. Lakhe (2011). ISO certification and business performance: empirical findings of Indian SMEs, *International Journal of Business Excellence*, Vol.4, No. 6, pp715-730
3. Davies, J., & Hochman, S. (2007). The greening of the supply chain. *Supply Chain Management Review*, 11(5), 13-14.
4. Elting, J., (2009). *Green Supply Chain Management in Manufacturing Companies in New Zealand: A Comparative Case Study Analysis*. Thesis submitted in partial fulfillment of the requirements for the degree of Master of Business Unitec New Zealand
5. Geyer, R., & Jackson, T. (2004). Supply loops and their constraints: The industrial ecology of recycling and reuse. *California Management Review*, 46(2), 55-73.
6. G. Kannan , , P. Sasikumar and K. Devika (2010). A genetic algorithm approach for solving a closed loop supply chain model: A case of battery recycling, *Applied Mathematical Modeling*, volume 34, issue 3, pp655-670.
7. Handfield, R., Walton, S., Sroufe, R., (2002). Applying environmental criteria to supplier assessment: A study of the application of the analytical hierarchy process. *European Journal of Operational Research* 141, pp70-87.
8. Jackson, T., & Clift, R. (1998). Where's the profit in industrial ecology. *Journal of Industrial Ecology*, 2(1), 3-5.
9. Khoo, H. H., Bainbridge, I., Spedding, T. A., & Taplin, D. M. R. (2001). Creating a green supply chain. *Greener Management International*, 35(3), 71-88.
11. Kumar, S., Chattopadhyaya, S., Sharma, V. (2012) Green Supply Chain Management: A Case Study from Indian Electrical and Electronics Industry, *International Journal of Soft Computing and Engineering (IJSCE)*, 1(6), 275-281
12. K.C.Shang, C.S.Lu, S.Li (2010). A taxonomy of green supply chain management capability among electronic related manufacturing firms in Taiwan, *Journal of environmental management*, 91, pp1218-1226.
13. Lamming, R.; Hampson, J., (1996). The environment as a supply chain management issue. *Brit. J. Manage.*, 7 (Special issue 1), pp45-62.



14. Mahler, D. (2007). The sustainable supply chain. *Supply Chain Management Review*, 11(8), 59-60.
15. Markley, M. J., & Davis, L. (2007). Exploring future competitive advantage through sustainable supply chains. *International Journal of Physical Distribution & Logistics Management*, 37(9), 763-774
17. Piplani, R., Pujawan, N., & Ray, S. (2008). Sustainable supply chain management: Foreword. *International Journal of Production Economics*, 111(2), 193-194.
18. Pun, K.-F., Hui, I.-K., Lau, H. C. W., Law, H.-W., & Lewis, W. G. (2002). Development of an EMS planning framework for environmental management practices. *International Journal of Quality & Reliability Management*, 19(6), 688-709
20. Qinghua Zhu, Joseph Sarkis, Kee-hung Lai, (2008). Confirmation of a measurement model for green supply chain management practices implementation, *Int. J. Production Economics*, 111, pp261–273.
21. Ramudhin A., Chaabane, A.(2010). Carbon market sensitive sustainable supply chain network design, *International Journal of Management Science and Engineering Management*, 5 (1), pp30-38.
22. Rao, P. (2007). Greening of the supply chain: An empirical study for SMES in the Philippine context. *Journal of Asia Business Studies*, 1(2).
23. Reiskin, E. D., White, A. L., Johnson, J. K., & Votta, T. J. (1999). Servicizing the chemical supply chain. *Journal of Industrial Ecology*, 3(2-3), 19-31.
24. Reinhardt, F. L. (1998). Environmental product differentiation: Implications for corporate strategy. *California Management Review*, 40(4), 43-73.
25. Rezaee, Z., & Elam, R. (2000). Emerging ISO 14000 environmental standards: a step-by-step implementation guide. *Managerial Auditing Journal*, 15(1-2), 60-67.
26. Robinson, D. R., & Wilcox, S. (2008). The greening of the supply chain. *Logistics Management*, 47(10), 67A-72A.
27. Sarkis, J. (2003). A strategic decision framework for green supply chain management. *Journal of Cleaner Production*, 11(4), 397.
28. Seuring, S. A. (2001). Green supply chain costing. *Greener Management International*(33),71.
29. Seok Jin Lim, Suk Jae Jeong , Kyung Sup Kim , MyonWoong Park, (2006), Hybrid approach to distribution planning reflecting a stochastic supply chain, *Int J Adv Manuf Technol*, 28: pp618–625.
30. Srivastava, S. K. (2007). Green supply-chain management: A state-of-the-art literature review. *International Journal of Management Reviews*, 9(1), 53-80.
31. Thierry, M., Salomon, M., van Nunen, J., & van Wassenhove, L. (1995). Strategic issues in product recovery management. *California Management Review*, 37(2), 114-135.
32. Trowbridge, P. (2001). A case study of green supply-chain management at advanced micro devices. *Greener Management International* (35), 121.
33. Vachon, S., & Klassen, R. D. (2006). Extending green practices across the supply chain. *International Journal of Operations & Production Management*, 26(7), 795-821.
34. Walton, S.V., Handfield, R.B., Melnyk, S.T., (1998), The green supply chain: Integrating suppliers into environmental management process, *International Journal of Purchasing and Materials Management*, Spring,pp 2–11.
35. Zhu, Q.; Sarkis, J., (2006). An inter-sectoral comparison of green supply chain management in China: Drivers and practices, *J. Clean. Prod.*, 14, pp472-486
36. Zhu, Q., & Sarkis, J. (2007). The moderating effects of institutional pressures on emergent green supply chain practices and performance. *International Journal of Production Research*, 45(18/19), 4333-4355.

### **Acknowledgement:-**

This paper heavily borrows from the paper of Kumar,S., Chattopadhyaya, S., Sharma, V. (2012) Green Supply Chain Management: A Case Study from Indian Electrical and Electronics Industry, *International Journal of Soft Computing and Engineering (IJSCE)*, 1(6), 275-281 in terms of Literature Review and identification of the factors and the underlying dimensions for assessing GSCM. Also the paper has mentioned some of the literature from the work of Elting,J., (2009). *Green Supply Chain Management in Manufacturing Companies in New Zealand: A Comparative Case Study Analysis*. Thesis submitted in partial fulfillment of the requirements for the degree of Master of Business Unitec New Zealand.